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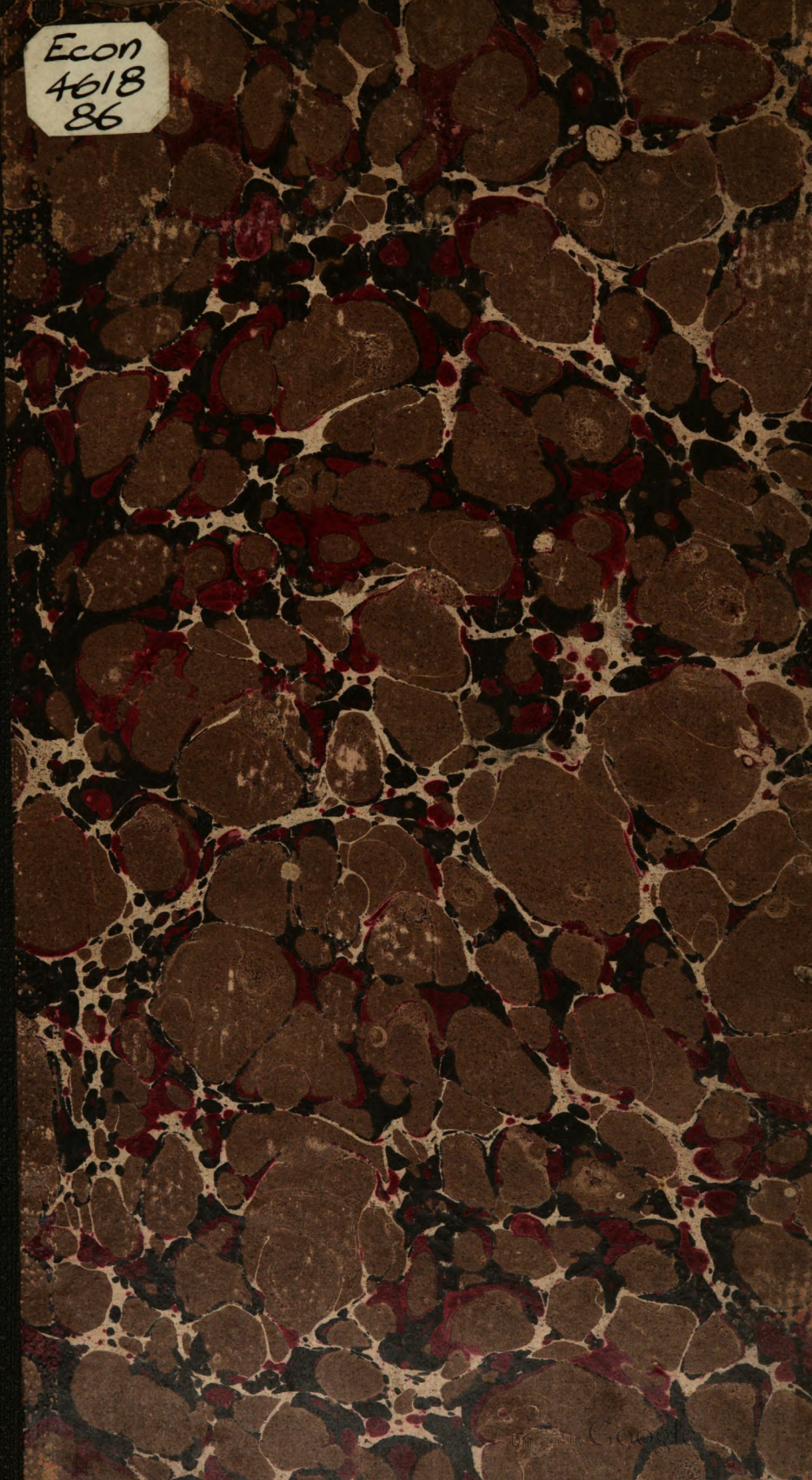
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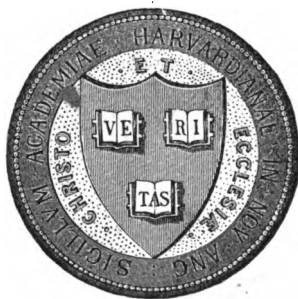
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FROM

Prof. G. F. Dunbar

12 Oct 1889



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ON THE  
SILVER QUESTION

BEFORE THE  
PROVIDENCE BOARD OF TRADE,  
THURSDAY, JANUARY 14, 1886,

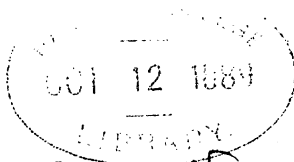
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Prof. L. F. Dunbar

to you the old Latin adage in vernacular English, "Beware of the  
Greeks when they come to you with gifts."

~~VF 5394~~

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## ADDRESS.

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GENTLEMEN OF PROVIDENCE:—Two addresses have lately been presented to you advocating the continuance of the present coinage of standard silver dollars weighing  $412\frac{1}{4}$  grains each, 900 fine, which are worth at the present time a little less than 80 cents in gold.

One of the wisest of the bi-metallists, Henri Cernuschi, has recently condemned this dollar in the most positive manner in these words: "It is by the ordeal of fire that money may be tried. The coins which, being melted down, retain the entire value for which they were legal tender before being melted down, are good money—those which do not retain it are not good money." Our silver dollar is bad money on the testimony of the most able and conspicuous advocate of bi-metallism.

One of your addresses was by Professor Andrews, of your University, whom I have not the pleasure of knowing, but whom I assume to be a very zealous and intelligent student and teacher of political economy. In the speech in which ex-Senator Hill represents himself as the special advocate of one of the minor products of our industry—silver—which he insists should be sustained at the cost and cost of all the commerce of the country, he makes an able, acute and plausible repetition of the errors of Professor Andrews. We must meet this preposterous demand for the purchase of one-half the annual product of our silver mines, at a heavy cost to our already over-taxed community, in the way in which it is made. Upon the modesty of ex-Senator Hill, who made this second address, far be it from me to comment. We may charitably impute his erroneous statements of most important facts, to the fact that he is a conspicuous example of the man who sees only the silver side of the shield. We may not impute to him willful errors, but I may rightly repeat to you the old Latin adage in vernacular English, "Beware of the Greeks when they come to you with gifts."



I can take no personal exception to this address of ex-Senator Hill, but let me remind you that both he and his coadjutors have elsewhere ventured to misconstrue the purpose, to impugn the motives and to misrepresent the objects of the opponents of the present coinage acts. It is therefore fit that with the measure which he has meted to others it shall be measured unto him.

The annual product of silver in the United States in recent years has been worth about \$40,000,000 (forty million dollars) in gold, varying a little year by year. It gives employment to a small number of men, generally under adverse conditions of life, and to a large proportionate amount of capital held in few hands. It has given rise to much speculative gambling in stocks, and to a few conspicuous and somewhat obnoxious fortunes. Far better would it have been for this country had there never been a silver mine discovered in it. Its unscrupulous representatives control the elections in three or four States. It sends so large a number of its special advocates to the United States Senate from States which have so sparse a population as to have but little numerical weight in the House of Representatives, as to endanger the passage of all acts of useful legislation since its advocates are under the stern behests of those who control them, to legislate for the special interests of silver first, and for the general interests of the nation second.

Is it not about time for the representatives of some other depressed industries to ask for an appropriation of \$2,000,000 (two million dollars) a month, to be expended in the purchase of their excessive production? Why not propose print cloths? The price of print cloths has been much more uniform than the price of silver for some time past. They might be a much better standard of value. The goods could be stored, and represented by print cloth certificates; and they would even be useful when forced upon a man who did not want them, because he could put them to some serviceable purpose. But what fools you would be to propose such a measure. What surer mode could you adopt for depressing the price of print cloths yet more. Your little trick would be sure to be found out sooner or later, and in anticipation of that, the pile of print cloths would bear down the price and keep it down, just as the pile of silver now in the treasury vaults of the United States bears down the price of silver, lest it should come suddenly upon the market. All the bankers and bullion dealers in the world know that Uncle Sam will sooner or later find out the little trick of the Bonanza kings, and that when found out,

their advocates, whether in the Senate or elsewhere, will find it hard to get a hearing among business men, or to justify themselves among workingmen. Fortunate may it be for them if they are saved from being mobbed by the workingmen, a danger which the men who a few years since imposed silver dollars upon the Sandwich Islanders for their own selfish purposes, barely escaped.

Why should not the copper and nickel mines be sustained in the same way?—their interests are depressed. Why not coin two million dollars' worth of copper and nickel into five-cent pieces each month—make them a full legal tender and force every workman to receive them at the rate of twenty to a dollar, for their wages.

It would be just as honest, just as lawful, just as safe to do so, as to compel them to take clipped dollars made of silver worth only 80 cents. The act by which twenty nickels should be made to do the work of an honest dollar by force of law would be no greater legal fraud than the act by which clipped silver dollars, worth only 80 cents, will soon become our only standard of value.

But far be it from me to include with the representatives of the silver mines who, under the misnomer of Senators and Representatives of the United States, now threaten this country, the thoroughly honest men in Congress from other States who esteem it to be their present duty to combine with the silver advocates, no matter how much they may distrust their motives, in order to promote what they themselves believe to be a true financial policy.

For many of the so-called silver men in Congress I have the most sincere personal respect. They are honest bi-metallists; they have no special silver interest to promote; and they are as averse to the single silver standard as they are to the single gold standard. Upon them will rest a grave responsibility when the day comes for decision, as it will surely come, and that ere long if the present coinage of silver dollars is continued, whether this country shall be a bi-metallic country, making use of both gold and silver, or a mono-metallic country on a single silver basis. I have such confidence in the integrity of purpose of the great majority of those who are counted at present on the side of silver in Congress, that I believe they will vote to suspend the coinage of silver dollars whenever the danger of forcing the country upon a single silver standard becomes as apparent to them as it now is to almost every prominent business man in every section of this country, not only in the East but in the West and South.

Let me here remark that I believe the same mistake is now being made in the East in regard to the prevailing opinions of the West and South as was made in regard to Western opinion on the greenback issue, at the time of the inflation bill. President Grant himself told me that he destroyed a message which he had written to accompany the greenback inflation bill, signed, which bill he at first intended to sign in deference to what he supposed to be the public opinion of the country—and that he substituted the veto message when the numerous and vehement protests came in, especially from the West, signed by men whom he himself knew to be of the soundest judgment and integrity. He said that these written protests, coupled with the great anti-inflation meetings in New York and Boston, proved to him that the atmosphere of Washington was not conducive to the true knowledge of the solid sense of the country.

I well remember his words. They made a profound impression upon my mind, and I can repeat them almost word for word. "I had not that confidence in my own unaided judgment," he said, "which would have warranted me in resisting the action of Congress; but when these protests came in, and I found that I could follow my convictions of right and be sustained by such men as had signed them, I read over again the message which I had written to accompany the bill with my signature appended. I said to myself, 'These are all sophistries; you do not believe them yourselves, and no one else will believe them.' I tore it up and wrote the veto message, and there is nothing in my public life which has gratified me more than the manner in which that veto was sustained in the country."

Would that a veto might now suffice. Then should we be safe. But unfortunately the conditions are different, and it does not rest with President Cleveland to repeat the brave act of President Grant. If he could he would, and again would the President be sustained by the solid sense of the country.

The principal fallacies on which the case of ex-Senator Hill is made up, and which are accepted by Professor Andrews, are:

First. That the alleged fall of prices in all the necessities of life since 1873—to the end that general prices are now lower than in 1850—is due to an increasing scarcity of gold, and to an appreciation of gold in consequence of this scarcity.

Second. That this great fall in prices is a misfortune which is to be resisted, and that the tide is to be turned the other way.

In order to turn the tide the other way, both these gentlemen advocate debasing the standard of value to the present weight and value of the silver dollar, worth less than eighty cents. Neither of these gentlemen ventures to submit any reason for considering a general fall in prices as a misfortune, nor any evidence that gold is becoming scarce. Ex-Senator Hill makes the following allegation :

First. "The production of gold \* \* \* has been steadily declining for nearly thirty years."

Second. "The consumption of gold in the arts absorbs every dollar in the annual yield of the mines, leaving absolutely none for monetary use."

Now, there is nothing so false as a half-truth ; and the first of these two statements is of that kind. The thirty years covered by ex-Senator Hill extend from 1856 to 1885, inclusive.

I am reviewing the speech as it was reported in the *Boston Sunday Herald*. It has been claimed in rejoinder that the period covered by ex-Senator Hill was not the one cited by me. But even if the facts be sorted in any other way, it yet remains true that there has been no substantial reduction in the production of gold in any period of ten years since the first surface washings were exhausted. In order to sustain this point I now append a full statement, year by year :

**STATEMENT OF THE ANNUAL PRODUCTION OF GOLD AND  
SILVER IN THE WORLD EACH YEAR SINCE THE  
DISCOVERY OF GOLD IN CALIFORNIA.**

(FROM REPORTS OF DIRECTOR OF THE MINT.)

YEAR.	GOLD.	SILVER.	TOTAL.
1849.....	\$27,100,000	\$39,000,000	\$66,100,000
1850.....	44,450,000	39,000,000	83,450,000
1851.....	67,600,000	40,000,000	107,600,000
1852.....	132,750,000	40,600,000	173,350,000
1853.....	155,450,000	40,600,000	196,050,000
1854.....	127,450,000	40,600,000	168,050,000
1855.....	135,075,000	40,600,000	175,675,000
1856.....	147,600,000	40,650,000	188,250,000
1857.....	133,275,000	40,650,000	173,925,000
1858.....	124,650,000	40,650,000	165,300,000
1859.....	124,850,000	40,750,000	165,600,000
1860.....	119,250,000	40,800,000	160,050,000
1861.....	113,800,000	44,700,000	158,500,000
1862.....	107,750,000	45,200,000	152,950,000
1863.....	106,950,000	49,200,000	156,150,000
1864.....	113,000,000	51,700,000	164,700,000
1865.....	120,200,000	51,950,000	172,150,000
1866.....	121,100,000	50,750,000	171,850,000
1867.....	104,025,000	54,225,000	158,250,000
1868.....	109,725,000	50,225,000	159,950,000
1869.....	106,225,000	47,500,000	153,725,000
1870.....	106,850,000	51,575,000	158,425,000
1871.....	107,000,000	61,050,000	168,050,000
1872.....	99,600,000	65,250,000	164,850,000
1873.....	96,200,000	89,250,000	185,450,000
1874.....	90,750,000	71,500,000	162,250,000
1875.....	97,500,000	80,500,000	178,000,000
1876.....	103,700,000	87,600,000	191,300,000
1877.....	114,000,000	81,000,000	195,000,000
1878.....	119,000,000	94,800,000	213,800,000
1879.....	108,700,000	96,000,000	204,700,000
1880.....	106,400,000	96,700,000	203,100,000
1881.....	103,000,000	102,000,000	205,000,000
1882.....	99,000,000	111,800,000	210,800,000
1883.....	94,000,000	117,000,000	211,000,000
1884.....	95,000,000	115,000,000	210,000,000
Total.....	\$3,882,975,000	\$2,250,375,000	\$6,133,350,000

I beg to cite Hon. James B. Kimball, Director of the Mint, as my witness for the following figures which I will give, omitting fractions of a million :

The average production of gold in the decade from 1856 to 1865, inclusive, was \$121,000,000 each year.

The average from 1866 to 1875 was \$104,000,000 each year.

The average from 1876 to 1885 has been \$103,000,000 each year. (1885 estimated.)

You will observe that ex-Senator Hill's statement is half true. Would it not have been fairer to have given the facts as for other periods?

But a single generation has elapsed since the great discovery of gold in California, and a little later in Australia; and in each case the surface diggings poured a vast volume of gold into the commerce of the world during the first few years. The average annual product from 1850 to 1855, inclusive, was \$110,000,000.

But now take the whole period of thirty-six years from 1849 to 1885. The total production has been, in round figures, \$3,950,000,000, or a fraction under \$110,000,000 each year.

If, however, we take only the last *twenty-five* years since 1860, or since the first extraordinary product of the surface washings has been exhausted, we then find that the annual gold crop of the world has been one of the most uniform products, averaging \$105,000,000 each year, while, as I have said, the average of the last ten years has been \$103,000,000.

Had Senator Hill taken the whole period, thirty-five years, since 1850, his case would have been weak—had he taken twenty-five years he would have had no case—he took thirty years and proved a half-truth, which, as I have said, is more deceptive than an absolute falsehood.

This product has been subject to certain fluctuations, not as great as those in our grain crops. There was, however, greater falling off in the gold product between 1866 and 1873, when general prices were rising, even if all paper prices be then measured at the gold standard, than there has been between 1878 and 1884, while gold prices have been falling :

The product of 1866 was.....	\$120,000,000	} Prices rising.
Of 1873 the product was.....	96,000,000	
Of 1878.....	119,000,000	} Prices rising and then falling.
Of 1884.....	95,000,000	

If the falling off in gold production in the latter period caused depreciation of prices, why did not the falling off in the former period also cause depreciation of prices? Ex-Senator Hill would answer: Simply because Germany demonetized silver in 1877. Prices continued to rise until 1881 or 1882, and only began to fall after Germany had ceased to sell her old silver. Time will not suffice me to refute this fallacious reply which I anticipate. I can only refer him and yourselves to Prof. Laughlin's admirable "History of Bi-metallism," in which I think you will find how little this single act of Germany has had to do with the matter. It was a consequence, and not a cause,—a small element in the problem, and not a great one, as I will presently indicate to you in other ways.

Before we leave this era from 1850 to 1885, let it be remembered that the product of silver rose from \$39,000,000 in 1850, to \$118,000,000 in 1884.

The total product from 1850 to 1885, inclusive, has been in round figures \$2,340,000,000.

You will observe that the product of gold since 1850 has been nearly two to one in ratio to that of silver; and such has been the abundance of gold everywhere as to have enabled England to retain its store, the United States to recover all that was needed to supply the gold that had been driven away by the legal tender acts of 1861, Germany to substitute gold for silver in its bank reserves, Italy to resume specie payment, and yet there has not been a sign of scarcity of gold at any time or in any country.

Silver has not been demonetized in any one of these countries; the displacement of silver by gold has only been of that part which had been in bank reserves. It is the most suitable metal for a subsidiary coinage, which use constitutes a large element of demand in so-called civilized countries, while in Asia, Africa and South America, silver is almost the sole money metal. But the utter inconsequence and fallacy of connecting the great fall in prices which has recently occurred with the very slight annual variation in the gold product of the world since 1850, may be fully disclosed by going back another generation. It is admitted that the prices of the necessities of life are now less than they were in 1850. Thank God for it. I will not weary you with citations of authorities on this point. The methods of proving the general reduction of prices vary greatly; but all the different methods lead to one conclusion. General prices are somewhat less to-day than they were in the

period immediately preceding the great gold discoveries. Whether this is a misfortune or not we will consider later. Remember wages are a great deal higher.

Now, what was the product of gold and silver for a generation prior to 1850, by which the prices, then nearly as high as they now are, were sustained? I will give it to you by decades from Soetbeer's tables :

1811 to 1820.....	\$79,830,000
1820 to 1830.....	99,157,500
1831 to 1840.....	141,515,000
1841 to 1850.....	381,942,000
Total.....	<u>\$702,444,500</u>

Forty years average, \$17,561,112.

The production of silver in the same period was as follows :

1811 to 1820.....	\$243,347,500
1821 to 1830.....	207,252,500
1831 to 1840.....	268,402,500
1841 to 1850.....	351,187,500
Total.....	<u>\$1,070,190,000</u>

Average per year, \$26,754,750.

You will observe that the average annual product of gold was trifling in this period compared to what is now produced, and that the average annual product of gold and silver was less by twenty-five per cent. than the average annual product of gold only at the present time.

You will also observe that small as the product then was, it was steadily increasing from 1810 to 1850. Yet, on the most careful analysis of prices perhaps ever made, that by Professor Jevons, it appears that the prices of forty staple commodities fell in this very period of increasing product of both gold and silver, from a representative index number in 1810 of 142 to a representative index number in 1850 of 68, or more than 50 per cent. ; \$202,000,000, also, in nearly equal proportions ; the product of gold only being \$104,000,000. And yet the prices of staple articles in 1885 are less than they were in 1850. I may be able to give you the exact comparison between these two dates ; but at the present moment I can only give you the compilation from tables by Mr. William M. Grosvenor in the *Tribune* of January 4, 1882. His tables cover two hundred articles, comprising substantially all the necessities of life.



The comparison is not quite as suitable for this discussion as it might be, because the earliest date in this article is 1860, by which time the enormous supply of gold from the surface digging must have had some influence upon prices, because it was so excessive.

The cost of constant quantities of these two hundred articles being taken, we find that the same quantity in the same proportion which could be purchased on the first of May, 1860, for one hundred dollars, gold, cost in the depreciated currency in use May 1, 1866, \$157.60, or, if we reduce the currency prices to gold, the gold prices at the same date were \$126.04. The same quantity of the same articles could be purchased on November 1, 1885, for \$75.35, a fall of forty per cent.

The comparisons of the product of gold with the varying prices of commodities make it very apparent that the production and use of the precious metals constitute but one of the many factors which make prices. We find that prices have risen and fallen on the specie basis without any apparent regard to the increasing supply of gold; yet we witness in these figures the malignant effect of a depreciated paper currency.

You will observe that general prices in currency, by which standard all the purchases of the people were made, were fifty-seven per cent. higher in 1866 on a paper basis than they were in 1850 on the gold basis. Had wages risen fifty per cent. between these two dates? Not at all.

I cannot give you the exact rise in 1866. Wages were then higher; but in 1870, when we were nearer to an adjustment to a specie basis than in 1866, wages had advanced only thirty-five to forty per cent., while prices had advanced far more. This is an example of the way in which any debasement of the currency cheats the people who use it most. This is the way in which the debasement of the present gold standard of prices to the silver dollar standard will cheat the people of this country if it is not stopped.

Wages are higher to-day in gold than they were in currency in 1870. The people are a little better able to stand the fraud of a debased currency now than they were then; but they will soon find it out, and then woe to the men who have promoted the fraud, and who now impose upon the masses of the people the utterly false assumption that our endeavor to maintain the present standard is in the interest only of banks, bankers and capitalists. Why, gentlemen, if this coinage is to be continued and the standard is to be

debased to eighty cents or less, cannot each one of us speculate upon it, and may we not make great profits without working for them, as so many did out of the debasement of the greenbacks?

I have said that increase or fluctuation in the product of the precious metals constitute but one of the factors which make prices. I do not deny that they do constitute one element; and I myself am profoundly convinced that both gold and silver have been depreciated very largely by the excessive production since 1850; I am convinced that the reason why this depreciation has not found its expression in a general rise of prices is that the other factors which make prices and which have caused the great decline have been more potent in the direction of a fall than the increasing supply of money metal has been potent in the direction of a rise.

But before we consider these beneficent forces which have caused a general reduction in prices, coupled with a rise in wages, let us consider the other influences which have affected production, consumption, commercial credit, national credit, and all other elements of price, and which have caused great fluctuations in the two periods under consideration.

In 1810—an era of high prices—the Napoleonic wars, our war with Great Britain in 1812, the suspension of specie payment in Great Britain, the struggle for resumption, culminating in 1824; the revolution in France in 1830; the disturbance of the whole continent of Europe in 1848; the Crimean war; the English war with China in the early part of the fifties; our great civil war from 1861 to 1865; the Austro-Prussian war; the Franco-Prussian war, and all the other minor events of this period, in which the national debts of Europe have grown from about \$2,000,000,000, in 1880, to \$22,000,000,000, in 1885, and are still increasing; while we, in the latter part of this period, have incurred our huge debt and have already paid more than half of it. These have been prime causes of great fluctuations in price; prime causes of scarcity, and, therefore, to some extent, of high prices to those who could afford to buy, while many have been reduced to such adversity that they could not buy at all. Let me advise ex-Senator Hill that a debasement of the currency will not alone suffice to raise prices. He must get up another civil war or a foreign war besides, in order to effect his purpose; then he would doubtless again make the rich richer and the poor poorer—as the greenbacks did.

But yet more potent than all these events which I have cited,

which constitute the turmoil upon the surface of life—more potent than these adverse elements by which prosperity has been retarded and human welfare has been for the time disturbed, have been the silent and beneficial influence of science and invention. I may venture to present to you the beneficent forces by means of which the low prices and the high wages of the present day have been brought about, at the end of this address, if time suffices.

While these great and beneficial forces of science and invention have been working in the direction of a reduction of prices in all the necessities of life, a great rise in wages has occurred. This reduction of price has happened in the face of the enormous and sudden inflation in volume of the money metals of the world. I use the word "inflation" advisedly, not dogmatically, and not without the citation of authorities, which are so conspicuously absent in the address of ex-Senator Hill.

The entire production of gold and silver since the discovery of America in 1492 to 1884, inclusive, has been compiled by Soetbeer, as follows: Gold, \$7,284,790,259; silver, \$8,486,512,000. You will observe that more than *fifty* per cent. of the product of gold, and more than *twenty-seven* per cent. of the product of silver has been added to the money metals in a single generation between 1849 and 1884.

But this vast increase in the volume of the metals by which the exchanges of the world are measured has been accompanied by a yet vaster increase in the production of the necessities of life, so that it has happened that while the wages and earnings of the masses of the people whose daily bread depends upon their daily work have risen, the cost of subsistence has been greatly reduced. It is not wealth but welfare which is important. In proof of this statement I can only make use again of the table with which many of you are already familiar, to wit: The progress of the cotton mills working upon heavy sheetings, the data covering fifty years.

Here let me say that the result of all my own researches has led me to give preference to the data which can be obtained from single establishments which have been under the same control for a long period, as compared to miscellaneous statistics of manufactures, in respect to which the relative conditions may have varied greatly between two or more periods under consideration.

You are well aware that the wages or earnings of all classes who are engaged in analogous work vary substantially from time to time

under the same influences which affect any leading branch of work of one kind. For instance: if it is found that the wages in a cotton factory have changed materially between any two dates, it will also be true that the wages in all other textile factories—the wages of domestic servants and of sewing women, and the wages of many other classes—will have changed in substantially the same ratio. If the wages of the men who are employed in the mechanical department of a cotton mill have changed, so will the wages of all machinists and mechanics; and so on.

There is a tendency of wages to the same level in work of like kind or in work in which like abilities are called for. Now, Mr. Grosvenor has proved conclusively that the prices of the necessities of life were twenty-five per cent. less in 1885 than in 1860.

The average earnings of men, women and children in a cotton mill which has been uniformly successful during fifty years, working on standard sheetings, were \$190 a year in 1860, and in the same mill in 1885 they were \$270 a year. There was a less proportion of men working in that mill in 1885 than in 1860, and the hours of labor were shorter. The increase of wages is over forty-two per cent.; but in consideration is given to the change from male to female work, and to the shortening of the hours of labor, the increase is more nearly fifty per cent. than forty-two per cent. As I have said, what is true of the cotton mill is true of all the arts of New England. I have investigated many textile, mechanical, manufacturing and other arts, and the rule is well sustained, to wit: A steady and regular advance in the rate of wages from the earliest date on which I can obtain any information, accompanied by an increasing purchasing power of each dollar's worth of wages, except during the malignant era of paper money.

In almost all branches of mechanical work the rise is greater than in a cotton mill, because the wages in a cotton mill were somewhat reduced between 1882 and 1885; while in many other branches of industry there has either been much less change or else none at all. In my judgment, now that the great force of not less than 500,000 men who were suddenly displaced from the work of building railroads between 1882 and 1884 has found employment elsewhere, so that there is to-day little or no idle labor in the country, the working people of this country, as a whole, are now more prosperous than ever before, if consideration be given to what the money which they earn will buy in the shape of the necessities and comforts of life.

Now, gentlemen, bear in mind that not less than ninety per cent. of the people of this country are in the position of wage-earners or recipients of small salaries, or small farmers who work harder than their hired men. Then consider that while prices have fallen twenty-five per cent., wages and earnings *measured by gold coin*, have advanced from forty to sixty per cent. Witness also that the present annual product of gold is almost up to the average of the whole period since 1849; and since the recent discovery of gold upon the Amoor river, may be greatly increased. Senator Hill affirms that the entire product is used in the arts. He can find no authority for such a statement. It is true that a larger proportion is used in the arts than formerly, because the supply of gold is so excessive that it can well be spared. Dr. Soetbeer's figures for the last four years show about six-tenths of the known products so used. Senator Hill undertakes to say that Asia and Africa use up the rest. What does he know about the gold products of those continents, which isn't counted? If I were to allege that it is as great as the consumption in their arts, my say-so would be as good as his, and neither would be worth a rap. Back ex-Senator Hill if you dare, in his attempt to debase the standard by which all our prices are now established, in order to advance the interests of the present owners of the silver mines, whose product is less than one-half the value of the hens' eggs which are annually yielded by our domestic hen yards. Why, gentlemen, if you join in ex-Senator Hill's audacious attempt, the very geese will hiss at you. [Laughter.]

The fears of the so-called silver men in Congress and elsewhere, who are as disinterested in their opinions as Prof. Andrews, call for more careful consideration. They hold that silver can be demonetized and thrown out of general use by acts of legislation, and that the whole money work of the world can be thrown upon gold. Upon this point I can only refer you to what I have submitted elsewhere.

The Hon. A. J. Warner, for whom I have great personal regard and esteem, but to whose present plans I utterly object, although I had thought at one time that his first proposition possessed some merit, has absolutely exhausted the literature upon this subject, and he adopts the estimate of \$4,000,000,000 of gold and \$3,500,000,000 of silver. He and others fear that if the Bland act is repealed, the burden of exchange will be thrown exclusively upon gold, and the whole \$3,500,000,000 of silver will be *demonetized*, not only in the

United States and Europe, but in South America, Asia, Africa and all the islands of Polynesia.

Before we can treat this subject with any intelligence, we must first consider the way in which gold and silver came into use as money metals. Upon this point I may be permitted to make some extracts from a recent communication of my own to "Bradstreet's":

Gold and silver have become "the *precious* metals for two reasons:

First—Because of their beauty and their durability and their divisibility.

Second—Because they are the most suitable metals to be made into coins for use as money.

In fact their superiority for use as "*money metals*" has given them that specific title in common speech. The world might be saved a vast deal of uncertainty and loss if courts of competent jurisdiction would now give a legal definition to the word money, and restrict it in law to coins made of gold or silver. By a process of natural selection gold and silver became standards of value and instruments of exchange before they were either coined or minted—then passing wholly by weight.

The precious metals appear to have been used as money metals, both by weight and in the form of coins, before the conception of a statute legal tender had taken the form of an act of legislation or decree in any state or nation.

The origin of acts of legal tender is not given by any authority within the knowledge of the writer. Good money needs no act of legal tender to enforce its acceptance by the creditor, unless there is a dispute in regard to the terms of the contract on some other point than on the quality of the money tendered.

Legal tender is a supplementary function of money—not an essential one.

Hence an act of legal tender by which the terms of all existing contracts are impaired can only be justified as a war measure for the collection of a forced loan or else the only result must be to render all loans at long date unsafe, lest an option should be given to a debtor to force a creditor to accept coin of lower value than the coin promised, while depriving the creditor of any choice as to what coin he will receive.

Volumes may be written, books and essays may be multiplied to any extent, yet at last the only possible conclusion is that if a debtor

offers to pay in the kind of money which he promised no act of legal tender is needed—if he offers a poorer kind of money no act of legal tender can justify him, except he is a bankrupt.

Gold and silver are used to-day as money metals both in the form of bullion and in the form of coins by states and races, some of whom cannot coin them, while others *will* not. They are so used by nations or races by whom statutes of legal tender have not been enacted, or to whom acts of legal tender are unknown and who would be incapable of comprehending them if they were suggested. The greater part of the silver now in use as a money metal is made use of by nations or races of the latter class. Hence it is beyond the power of any single state or group of states, Latin Union or otherwise, either to *monetize* or to *demonetize* silver, therefore the effect imputed to their action in respect to legal tender legislation is grossly exaggerated.

It follows of necessity that the common use of gold and silver as money metals never did rest upon acts of coinage nor upon acts of legal tender, and does not rest upon such acts at the present time.

The only effect of acts of legal tender or of their repeal is to create a limited special demand for one metal or for both, mainly for the purpose of a reserve in the banking system of the country. Such reserves have constituted a very moderate part of the silver which is made use of for money purposes, even in states in which it is a full legal tender, the principal use being for what we call small change, for which purposes silver will continue to be used whether a full or partial tender, or even if not endowed with any legal tender functions whatever.

Gold and silver are both monetized by a higher law than that of any state or group of states; bi-metallism exists in the nature of things. If a legislative body can by its *fiat* make silver or gold money, or if by its *fiat* it can unmake or demonetize either metal—is it not folly to exercise this *fiat* in respect to such costly substances? Why not stamp or coin paper or leather at once? The able brief of Thomas H. Talbot in the last legal-tender case seems to have convinced the court that such power rested with the Congress of the United States, but whatever the letter of the constitution may be, it may hardly be supposed that either the counsel or the court would accept such a conclusion as being possible in fact.

Silver has not ceased to be money in England or Germany, although it is not a full legal tender. Gold has not ceased to be

money in Holland, although for a time it ceased to be a full legal tender.

All that can be done by statutes of legal tender is either to give a debtor *no* choice as to which kind of coin he may offer in fulfilling his specific contract, or else to give the debtor the choice between *two* kinds of coin, one made of gold and one made of silver; or lastly, according to our absurd practice in the United States, to give the debtor the choice between *two* kinds of coin of different value and *one* paper substitute for coin resting for its forced use upon the caprice of legislation, while we deprive the creditor of any right whatever to choose which kind of real money or of mock money he will accept.

The civilized world is now disturbed by the variation in the ratio of silver to gold, and by the changes which have been made in recent years in the acts of legal tender of various countries. A bitter contest exists between those who are known as *bi*-metallists and those who are known as *mono*-metallists. These titles are inaccurate and misleading. The true terms which ought to be substituted are that on the one side certain persons advocate a *single* legal tender or *mono*-legal tender, and on the other side a *double* legal tender, or *bi*-legal tender, or in the United States a *tri*-legal tender.

It should be observed that the use of silver as the principal money metal exists in states or continents wherein dwell perhaps 1,000,000,000 people out of the computed total of 1,400,000,000 of the population of the globe. The so-called civilized nations, numbering little over 400,000,000, being the richest, make the greater use of gold. The semi-civilized or barbarous nations are the poorest, and they make the greater use of silver. It is beyond the power of civilized legislation to displace silver as the principal money metal in the larger part of Asia, in almost the whole of Africa, and in South and Central America.

When any consideration is given to the true forces which cause silver to be used as the principal money metal by about three-fifths of the entire population of the globe, even an ex-Senator from Colorado might have some doubt of the power of the Senate either to monetize or demonetize this metal.

I cannot wonder at the delusion of so many men, which has been so constantly stimulated by the owners of the silver mines and their attorneys.



Mr. Hill and his coadjutors allege that unless silver is sustained by law as a full legal tender in the United States the whole of the vast sum of \$3,500,000,000 of silver coin will cease to be money, and the burden will fall on the \$4,000,000,000 of gold. They allege that whether these sums be precisely accurate or not, yet nearly one-half the present money metal of the world will be *demonetized*—will cease to be used; that coins made of it will cease to serve as instruments of exchange, unless the Bland act, or a substitute of like character, be sustained.

It is merely necessary to state this case in its plain, bald terms to prove its absurdity. Is the ryot of India, the coolie of China, the gaucho of the Pampas, or the islander of the Pacific, likely to be so much affected by an adverse decision of the Congress of the United States on the Bland bill as to instantly lose confidence in the quality of their coins or other forms of silver which pass among them, and to rush into the market to secure a part of an insufficient stock of gold? What an absurdity! Will Uncle Sam give up dimes, quarters and halves; will John Bull throw the shillings overboard; will Johnny Crapaud turn his stockings inside out and cast away his hoarded francs; will the Dutchmen, high or low, let the Jews have their marks at half price, when silver loses its full legal-tender quality in the United States, and sensible men conclude that one choice only should be given to debtor and creditor alike in the enforcement of a contract by a court?

Yet in this citation of the present use of silver I have recited the use which probably seven-eighths of all the silver in use as money now serves. Men who declare that general acts of legal tender must be passed and that impossible national agreements must be entered into in order to maintain the use of silver as a money metal, must be either very superficial reasoners upon financial history or very unscrupulous advocates of the petty product of silver in this country.

The only change in the use of silver which is worked either by the enactment or repeal of acts of legal tender is as to that very small part which has been or may be kept in the reserves of banks. What else?

There are, in fact, great forces at work which may create an increasing demand for silver coin within a short period, and which may raise its value when we cease to bear the market by our heavy and useless stock.

I beg you to consider the revolutionary effect which the railway must exert upon Asia, Africa, South America and Mexico.

Had not the mines of California and Australia been opened at a time just preceding the extension of the service of the steamship and the railway so as to include within their scope and effect the great commerce of so-called civilized nations, there might have been a great scarcity both of gold and silver. The extension of commerce since 1850 has, I think, been superficially attributed to the discovery of the great gold mines at this date—was it not in fact due to the new inventions which have been applied to the production and distribution of the means of subsistence? Of what possible use could this great volume of metal have been put to if agricultural machinery had not been invented, textile machinery improved, the railway extended and the capacity of the steamship to carry cargo increased ten or twenty-fold, so that the exchanges of the world and the need of money were vastly increased?

By analogy, how can the commerce of Asia, Africa, South America and Mexico be increased by the facilities which the railway will give, without also creating a vastly greater demand for silver coin when transactions in terms of money are substituted for barter, or when coins take the place of cowrie shells.

Until you distinctly separate what I may call the natural use of the precious metals as money metals, from the artificial use which ensues from the application of legal tender acts, I think you cannot attain very clear conceptions on this perplexing subject.

After a long and weary effort we restored our currency to the safe and stable basis of gold coin supplemented by a subsidiary coinage of silver redeemable in gold; shall we now permit our coin to be clipped; shall we degrade our standard to eighty cents on a dollar or less, just as we are prepared to enjoy the common welfare which science and invention have brought within our grasp? I trow not.

Gentlemen, the adjustment to the new conditions, to which I have called attention, has been made. We stand ready to-day to enter upon a career of common welfare such as the people of this country have never seen. Everything is ripe for it. The country is now tied to the safest and best standard of value. Our low prices are established upon the gold standard with the use of silver as a subsidiary coin. All wages, whether high or low, are on the same basis. As yet the coinage of silver dollars has only served the purpose of tokens. They are silver greenbacks, equal for the moment

to the purchasing power of gold, because they are practically *redeemed* in gold by way of the Treasury of the United States. How long can you keep them at par? That is the question. That is the doubt which to-day stops all enterprise and leads men to wait. How long shall we wait at the behest of ex-Senator Hill and his coadjutors? They cannot stop us long. By way of high wages intelligently earned in the application of labor to the greatest natural resources, we achieve our general production at the lowest cost in terms of money. Our working people are, decade by decade, securing to themselves an increasing share of an increasing product. Our prosperity as merchants and manufacturers rests upon their prosperity. When they thrive we thrive with them. When adverse conditions affect them our profits vanish. Ex-Senator Hill proposes to dock all their wages twenty per cent. or more in order to help commercial men and raise prices. We don't want any such help. It is a fraud. Working people are our principal customers. If we dock their wages and scale down their savings bank deposits twenty per cent., they will suffer most, but in the end we shall pay for it.

Not only can we supply ourselves with an excess of all that is needed to eat, drink and wear at high wages and low cost, but in 1880 seven per cent. of the products of agriculture were exported. Applying this percentage to the number of persons then engaged in agriculture, and we find that in the census year there were more than 1,300,000 farmers and farm laborers who were engaged in feeding the hungry and clothing the naked of foreign lands, while we ourselves had more than enough to meet our need. If we add to this number all who were engaged in moving this product to the seaboard, and in the manufacture of products other than agricultural for export, we find a total of not less than one and one-half million working people whose product entered into the great commerce of the world. They constituted nearly nine per cent. of all who were occupied in all branches of gainful work in that year, whether mental, manual or mechanical. They constituted more than ten per cent. of all who were engaged in directly productive industry; in exchange for the labor of this great force upon whom nearly five million out of our fifty million population then depended, we received back the vast amount of our imports. Of what did these imports consist? \$200,000,000 worth of articles of food, constituting 32 per cent. of the whole import; \$160,000,000 worth of crude materials which are absolutely necessary in the processes of our domestic industries,

25½ per cent. ; \$73,000,000 worth of partly completed manufactures for use in the further processes of our domestic industries, 11½ per cent. ; \$130,000,000 worth of fully manufactured goods and wares ready for use, 20½ per cent. ; \$65,000,000 worth only of what might perhaps be called articles of luxury, 10½ per cent. More than two-thirds of articles of food or materials which are used in the processes of domestic industry.

The volume of imports, like the volume of exports, is measured by the standard of gold coin, from which it cannot be torn away, because no malignant act of legal tender can force a base currency into the great commerce of the world. Resist as we may the great laws that control the commerce of the world, and yet we find that they have made all the nations of the earth *interdependent* and have forced them to use honest money whatever tricks they may play with their own currency.

I have recited to you the proportion of our population whose products find their market in foreign countries. Without that market what would be our condition? The whole balance of society would be altered. Again, I have recited to you the volume and kind of imports which we receive in exchange for the products exported. Were we deprived of these imports, again would the whole order of society be changed. Taking import and export together, fifteen to twenty per cent. of all who are engaged in gainful occupation in this country are tied to the conditions of foreign traffic, whether they will or no, either by way of the export of their surplus products, or by the import of crude or half manufactured articles which constitute a part of the materials on which they work.

This foreign traffic is tied to the standard of gold valued by weight of metal, because no act of legal tender of any state or nation can affect it. It is the balance-wheel of our whole domestic industry. Attempt to separate our own standard of value from that of the great commerce of the world, and all that you will effect will be confusion and loss.

I think you will perhaps bear with me a little longer, if I now submit to you a short treatment of the real forces which have effected this great reduction of prices in recent years. I do not deny that reductions of prices are adverse to many persons ; but is it not the very function of capital to help the world tide over what may be called the first destructive effects of improvement and invention, and to carry the world to the point where the beneficent results of such improve-

ment may be widely distributed? If capital cannot perform this service, it has no justification for its profits.

I will venture to repeat a part of my recent address to the American Association for the Advancement of Science, in order to bring before your minds some faint idea of the vast changes which have occurred in the generation which also witnessed the opening of the mines of Australia and of California.

I hope you will pardon me for repeating what has already been printed, because it has only been privately circulated to the extent of a few copies :

We will merely glance at the list of almost new forces which were perfected, extended or applied during the war, or which have been put to use since the war ended, both in this country and elsewhere.

Afterward we will consider the newly available areas of productive land which have been put to use in this and other countries during the same period, from which we now derive a part of our own abundance in exchange for the excess of our domestic products.

But before we consider these new forces, a few words need to be given to certain changes which occurred in the decade immediately preceding the war.

In ten years prior to 1860-61 California and Australia had suddenly rendered up their great stores of the precious metals, as if in anticipation of the needs of the great commerce which other discoveries and new inventions were so soon to bring into existence.

It is often, but I think mistakenly, supposed that there is a productive force or influence in gold and silver themselves, and that a great addition to the money metals of the world constitutes a great addition to the productive powers of the world. I question this view ; these metals are but instruments of distribution.

Had not the vast additions of the precious metals been accompanied or immediately followed by the application of these other forces, which I shall presently name, and which made greater production and wider exchange of products possible, the only effect of the addition of such a vast fund to the money metal of the world would have been a great advance in the prices of commodities ; and during such a period the rich would have become richer, while the poor would have become poorer ; for the reason that any inflation of the currency, whether on a paper basis or on a specie basis which is effected suddenly, raises prices much faster than wages follow.

Witness the effect of the great mass of gold which was suddenly placed at the disposal of Germany by the payment of the French indemnity. It may be questioned whether the disasters which ensued from this sudden accretion of wealth in Germany were not greater than the burden imposed upon France. It precipitated the one country into disastrous speculation, while the other went quietly to work to replace the devastation of war.

It is only the stimulus that rising prices have in making employment continuous, which renders them any benefit to those who work for wages.

The exchange of this vast increase of our products, which immediately followed the addition of our stock of money metal after 1850-60, might have been hampered and crippled for want of instruments of exchange, except for the discovery of gold; but to impute abundance of other products to this discovery, as a cause of the increase, might be like imputing the abundance of petroleum with which the world is now lighted, to the scarcity of whales. Many other analogies could be found.

In connection with the production of the precious metals the wonderful inventions in hydraulic mining may be named, which belong to the period now under consideration, in the application of which it has become profitable to wash a ton of gravel for ten cents' worth of gold.

Prior to 1865 the railway mileage of this country was less than 34,000, consisting in great measure of detached lines, many of them serving for merely local purposes. Even the consolidation of a through line from New York to Chicago did not take place until 1869. Now our railway mileage is over one hundred and twenty-five thousand miles, consolidated in great systems and worked with an efficiency and economy unknown in any other country. One-half of the traffic over these railways consists of food for man or beast. The grain crop of 1865 measured 1,127,499,187 bushels; of 1884, 2,981,920,332. That of 1885 will probably exceed 3,000,000,000, over 50 bushels per capita.

What would have become of this food had it been raised while the limit of transportation by wagon was limited within an area of one hundred and fifty miles? Would it not have rotted upon the field had it been produced?

It was the Bessemer method of making steel which rendered this

transportation of food possible over the longest distance at the lowest cost.

The man who now gives up one holiday in each year, and devotes it to earning wages, removes the obstruction of a thousand miles of distance in obtaining his year's supply of food. One holiday in the year devoted to work puts the mechanic of Massachusetts next door to the prairie of the west.

New inventions in the manufacture of steel even now in progress of application in this and other countries, may, presently, do away with the necessity of moving the ores of iron over long distances by rendering the presence of what have been impurities in the ore of little consequence; thereby bringing into immediate use the vast deposits of iron ore in the very heart of our own country which have until now been of little use and almost of no value. And when we adopt these processes we may then convert iron ore into food for man and beast, as they now do in Germany, where the waste of the "*basic*" process of making steel is now treated for the recovery of phosphate of lime which is left in the slag, to be converted into a fertilizer.

Is it not a startling thought that modern science has converted iron stone into food?

In the period under consideration the screw propeller has finally displaced the paddle-wheel in all ocean traffic. At the same time the compound steam engine has been perfected; the end of both being that the fuel required has been vastly reduced, and where it required over 200 tons per day of coal to cross the Atlantic twenty years since, a much more capacious steamer is now driven across by the use of 35 tons. But this statement is far from showing the full change; the important matter is the ratio of the fuel to the weight moved; every pound of coal now carries thirty-two times as much cargo across the Atlantic as could be carried thereby in the earlier days of ocean navigation. The steamer "*Persia*," in 1850, consumed 14,500 lbs. of coal to each ton of cargo, while even the racer "*Arizona*," in 1882, consumed only 450 lbs. per ton of cargo. In the freight steamers, assuming paper to have the same calorific value as coal, the combustion of an ordinary letter, such as is carried by mail for a two-cent stamp, would move a ton of cargo and its share of the vessel two miles. A lump of coal which can be mailed anywhere in the Postal Union for one cent would do the same work. Thus has room been made for cargoes of provisions or other mer-

chandise, now carried at low cost more than half way round the world, to feed and clothe the people of the most distant lands.

The Suez Canal has restored commerce to its ancient lines, but by more speedy and cheaper methods. The general adoption of the telegraph renders distribution quick and equal, and these two forces have done away with the necessity of accumulating and storing great stocks of merchandise at heavy cost, and in other ways have vastly reduced the cost of distribution.

Agricultural machinery has been perfected in this same period to the end that the equivalent of one man's labor for one year, in the direction of this machinery, is wheat enough to give a thousand people all the bread they customarily use during the same twelve months, while corresponding inventions, too numerous even to mention separately, have reduced the labor cost of producing corn, oats, and of making hay in almost equal measure. One man's work for one day will pay for moving a year's supply of grain and meat a thousand miles, and one man's work, for one year on the far-away plains of Dakota will yield wheat for a thousand people for the same time.

Not only have our own prairies and those of Canada been brought to the use of man by these inventions and the application of these new forces, but the vast plains of Australia, New Zealand and the middle sections of South America, upon the Paraguay and Parana rivers, now send their grain or their dry or frozen meat to the hungry men of Europe, and yield up the abundance of their wool to all who are wise enough not to obstruct its use. Except for the railway and steamship their products would have been almost without value.

Within this period the whole process of canning meat, fish, fruit and vegetables has been developed, the refrigerator car and steamship compartment have been constructed, cold storage houses and ripening houses have been invented:—in the latter the banana, one of the cheapest and most abundant of the tropical products, which was first introduced into the temperate zone as a luxury, may be ripened in such abundance and at so low a cost that it may yet become an important article of food, being very rich in nitrogen.

The oil wells of this country and Russia have given light to those who could never before extend their day's work beyond what the sunshine permitted. The invention of the pipe lines for distribution has enabled that product to be distributed. In this connection may be mentioned the extraction of colors; or, as my friend Dr. T. Sterry



Hunt, stated it, when I asked him to add to my list any other suggestion of important inventions, "the creation of new coloring materials from hydro-carbons, chiefly from the refuse of coal distillation, which have already made a revolution in dyeing and printing. Yet more important, perhaps, as suggestive of what may follow, we may name the artificial production of alizarine (the red of madder) and of indigo, both of which substances are now manufactured on a large scale, while the madder culture has been almost abandoned on account of the greater cheapness and the advantage in the use of the artificial substitute. This abandonment of madder culture is not a loss, but a gain: because it frees large areas of land in some parts of Europe which are needed for the cultivation of grain."

Not least among the advantages which have ensued from the distillation of petroleum, has been the substitution of the lubricants made therefrom in place of animal or vegetable oils; the latter, being subject to rapid oxidation, commonly called spontaneous combustion, were constant sources of danger in the factories where they were once used, while the mineral lubricants now in use, are absolutely free from this danger.

When we bear in mind this fact, that important products like indigo and alizarine have been derived from these mineral sources, is it visionary to suggest that a time may come when the *hydro-carbons* may be converted into the *carbo-hydrates* of which we hear so much in the chemistry of food? After we have converted iron-stone into food by way of the laboratory of the soil, and since we have generated colors and perfumes from coal tar, may we ever expect to convert the hydro-carbon of petroleum into the carbo-hydrate of the physiologist in the laboratory of the chemist? Another revolution has occurred in the production of soda by the ammonia process, replacing the old method and dispensing with the use of sulphur. We all know that the march of civilization may be measured by the demand for soda ash and other alkalies.

In connection with this may be named the processes by which all the volatile products of the coke ovens are now saved, and a vast product of oils and ammonia is thus obtained.

In medicine the artificial product of the alkaloids such as morphine and quinine may be mentioned as among the possibilities of the near future. To these may be added the great discoveries which have been made during the last few years in the use of antiseptics, especially in connection with the preservation of fruits, wine, beer, etc.

Electricity has been put under control as yet mainly for light, but who can tell how soon the electric current will be divided or when this old but ever new force may be placed in every household, to be applied even more readily than the force generated by the combustion of coal?

Among the lesser of the new mechanical forces which have been applied during this period, we may name the substitution of the roller for the mill-stone in the preparation of flour, while the wheat elevator for the storage of grains has been perfected.

The driven well, which may hereafter make many a desert blossom like the rose.

The application of the diamond drill, worked by steam or compressed air to the boring of these wells, and also to mining.

The use of nitro-glycerine, or other high explosives in mining.

The application of steam or hydraulic power to the derrick or the crane for handling heavy weights, and for loading and unloading vessels.

The introduction of the elevator, lift or vertical railway into hotels, office buildings and warehouses, whereby the aggregate rent of land has been reduced, although the special rent of particular places may have been increased.

Not least among the developments of this period has been the great perfection to which machine tools have been brought, accompanied or rendered possible by the adoption of standard measures and gauges, to the end that the interchangeable system has been applied to almost every kind of mechanism from the locomotive engine and the sewing machine to the finest watch. The sewing machine has become the common implement of the housewife, the seamstress, the shoemaker and the sailmaker.

A woman may pass through the office of a Lynn boot and shoe factory to inspect the work, who, being measured as she passes the office, will find a pair of boots perfectly fitted to her foot, finished and ready for her use as she goes out, after having looked over the five floors of the factory. The boots will have passed from machine to machine much faster than she can comprehend the process of the work even in the most superficial way.

Every one of you will add something to this list, each important in its place. And to these absolutely new applications of science may be added improvements in the construction of old machines previously invented, especially in the textile arts, by means of which

the product has been increased and the requisite number of laborers has been reduced and wages have been increased in greater measure than in any previous period since the substitution of automatic machinery for the spinning wheel and the hand loom.

In the cutting and preparation of timber and its conversion into boards, I have been told that a few simple inventions have rendered the work of one man as effective as that of sixteen men twenty years ago. A little stream of cold water distributed from the hollow axle of the circular saw, to keep the saw cool, has rendered it possible to substitute six-foot circular saws and a steam feed for four-foot saws or less, fed slowly by hand. The planing machine invented a little earlier has come into practical use, together with innumerable other inventions in wood working.

The application of iron and steel to purposes of construction has made vast progress, of which the elevated railway in New York is a conspicuous example. The common use of structural steel may also be named and the development of the cantilever principle in bridge construction.

But iron is less useful, less safe and more costly than timber and brick, even at the present prices, for the construction of mills, works and warehouses; and in these branches of construction very great progress has been made in the combination of brick and timber. By the adoption of suitable methods the modern American factory has become one of the safest fire risks in the world, costing less for its insurance than the so-called fire-proof factory of Great Britain.

In this connection reference may be made to some of the possibilities of the future.

The adoption of steam power and the use of coal gas for lighting have rendered a great concentration of the manufacturing and mechanical arts an absolute necessity; this concentration of the work in closely built towns and cities has of necessity been followed by concentration of population under adverse conditions, both with respect to health, economy of rent and other matters.

Whenever the electric current can be divided economically, so that a measured amount of power or light may be sent over wires in different directions from the same source, water power may be utilized where dams can be built with the greatest economy, but which are now useless for want of proper space for the construction of factories near them.

Large steam engines working at  $1\frac{4}{10}$  lbs. of coal per horse power per hour, or less, may be substituted for small steam engines requiring from four to eight lbs. Gas for heating purposes may soon be as widely distributed as it now is for illuminating.

Under such conditions, power and light being furnished in the same manner, the directions for the work given by the telephone from the city office, factories which now occupy dangerous and unsuitable positions in the fourth, fifth and sixth stories of our city warehouses, may be scattered over a wide area in the suburbs of the same cities, in well ventilated and cheaply constructed one and two story factories, surrounded by dwelling places, each with its small plot of land, where the working people can live under vastly better conditions than they can now live in the narrow courts and streets of the cities.

Less conspicuous but even more important than almost any discovery or invention yet named in their ultimate effect upon our food supply may be recited the opening of the Stassfurt potash mines in Germany, and the discovery and working of the phosphate beds of the United States and quite recently those of Canada.

In the latter, deposits, which are 80 per cent. phosphate of lime, have been found in almost inexhaustible quantity, and under such conditions that they will be very cheaply furnished to all our western and northern states and territories.

Mention may also be made of the mines of very pure salt on the Canada side of Lake Superior and in Wisconsin which may presently yield, if they do not already, the necessary supply of salt most suitable for the preservation of meat; these mines are also close to the prairies of the west and subject to our use whenever we are wise enough to remove the obstructions which now render the import of salt more costly than it need to be.

These discoveries were prophetic. Who knows yet what may come from the alkali plains of the far west or from the volcanic region which lies between Oregon and California? None can doubt that there are mines yet to be opened in that section more precious than those of silver or gold, of which one example may be mentioned, consisting of vast deposits of sulphate of alumina lately discovered.

I may venture to add, among the most important applications of science to agriculture, the re-discovery of the system of preserving green crops in pits known as "ensilage."

There remains but one great discovery to be made to round out

and complete this list which I have presented to you, and to perfect the series of the present generation.

Whoever can attract the nitrogen of the atmosphere, and combine it with the potash of Germany and the phosphates of South Carolina or Canada, will add the last element necessary to secure permanent abundance in agriculture at the least cost.

It is possible, I will even say probable, that the solution of this question may lie in the one plant, as I will presently attempt to show you, which might well be adopted on the coat of arms of this country, namely, Indian corn. Perhaps this symbol may be justified in the peaceful war which we have just waged with our foreign enemies.

Who were our enemies when we were engaged in a contest for liberty? Were they not the privileged classes of Europe, whose main-stay has been the rent of the land possessed, but not worked by themselves?

We have attacked them with ship-loads of grain and meat. We have sustained the operatives of England who sacrificed even their daily bread in our cause, while we have rendered the collection of rent from land devoted to grain hereafter almost impossible in Great Britain, except it be earned by the owner himself who may put capital, brains and personal industry to the use of his own land.

Said I not rightly that greater progress has been made in the period which has elapsed since the beginning, or even since the end of our civil war, in the advancement of science and its application to human welfare, than in any other previous generation in the history of the world?

Time will not suffice for me to more than refer to the substantial foundation and extension of technical education in the same period both in this and other countries; to the beginning of scientific methods of manual instruction; to the great development of statistical science; and to many other intellectual factors which have also marked the era of which we are treating.

Here, then, we stand to-day, watching and waiting, loaded with the abundance that makes for human welfare; at peace among ourselves and with all the world; eager to put to use this excess which now gluts our markets, in the use of which every idle man, if there are any, will be employed. What wait we for? Only to be sure that the Congress of our country will not clip the coin and reduce the wages and earnings of the people by at least one-fifth.

If any one dared propose to clip the gold dollar of one-fifth of its weight and then force the working people to take the eighty cents' worth that remained for a dollar's worth of work, would he not be met with such a cry of execration that he could never show his face again among men? Yet that is the exact end of the act which ex-Senator Hill calls upon you to sustain. The working people of this country, and the clerks, teachers and salesmen, who live on small salaries, earn now as nearly as I can compute from \$4,500,000,000 to \$5,000,000,000 dollars a year, each dollar worth 100 cents. Ex-Senator Hill and his coadjutors propose to clip these coins one-fifth or more and at one fell swoop to strike off more than one thousand million dollars a year from the hard-won earnings of the people. I leave him to your tender mercy.









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